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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/026,471 | 12/27/2001 | Charles A. Miller | P155-US | 7770 |

23910 7590 06/08/2004

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| EXAMINER |
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NGUYEN, TRUNG Q

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| ART UNIT | PAPER NUMBER |
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2829

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,471

Applicant(s)

MILLER, CHARLES A.

Examiner

Trung Q Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-11,18,19,24,25,33,35 and 36 is/are pending in the application.
- 4a) Of the above claim(s) 8,12-17,20-23,26-32 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,9-11,18,19,24,25,33,35 and 36 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0503 and 0104.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Claims 8, 12-17, 20-23, 26-32 and 34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn under a restriction requirement, there being no allowable generic or linking claim. Election was made without traverse in Paper No. 0304.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 9-10, 18-19 and 33-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Patel et al. (U.S. 6,550,263).

As to claims 1, 18-19 and 35-36, Patel et al. disclose in Figs. 5-6 a cooling assembly comprising: probe elements 531, an electronic package 405 having a cavity 409, a plurality of dies 401 and face the bottom surface 403 and a coolant surrounding interconnects within the cavity 409, an inlet 411 and an outlet 413 coolant ports that allow the coolant to enter the cavity 409. Patel et al teach furthermore said cooling

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assembly comprising a coolant circulation system coupled to said coolant ports 411 and 413, wherein the coolant circulates within the package 405 and directly contacts all surfaces of each die 401 to directly cool active electronic components during their operation. Patel et al teach furthermore said cooling assembly comprising a cooling member 509, Fig.6, and a heat radiator 507, wherein each die is immersed in the coolant and the heat radiator 507 transfers heat generated by the die 501 to said cooling member 509.

As to claims 2-5, 9-10 and 33, 35, Patel et al. disclose in Figs. 5-6, a bottom substrate 403, wherein active electronic components face the bottom surface 403 and a coolant surrounding interconnects within the cavity 409, an inlet 411 and an outlet 413 coolant ports that allow the coolant to enter the cavity 409, wherein each die has at least one active surface associated with respective active electronic components, and when the coolant circulated in the cavity the coolant directly cools each active surface of each die 401.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 11 and 24-25, rejected under 35 U.S.C. 103(a) as being unpatentable over Patel et al in view of Dozier (U.S. 6,534,586).

As to claims 11 and 24-25, Patel et al teach a cooling assembly comprising: an electronic package 405, Figs. 5-6, having a cavity 409, a plurality of dies 401; a bottom substrate 403, wherein active electronic components face the bottom surface 403 and a coolant surrounding interconnects within the cavity 409, an inlet 411 and an outlet 413 coolant ports that allow the coolant to enter the cavity 409, wherein each die has at least one active surface associated with respective active electronic components, and when the coolant circulated in the cavity the coolant directly cools each active surface of each die 401. Patel et al teach furthermore said cooling assembly comprising a coolant circulation system coupled to said coolant ports 411 and 413, wherein the coolant circulates within the package 405 and directly contacts all surfaces of each die 401 to directly cool active electronic components during their operation.

Patel et al fail to disclose interconnects being compliant and comprising Lithographic springs. However, Dozier, 11 et al teach an IC photo Lithographically patterned spring contact, Fig.2, which along with being compliant also creates a gap between the active surface of the die and the substrate at it is a case in the device by Patel et al. Therefore, it would have been obvious to one skilled in the art at the time invention was made to employ an IC photo Lithographically patterned spring interconnects as they taught by Smith et al in the device by Tilton et al in order to decrease mechanical stress caused by thermal expansion of the components (to reduce thermal gradients on each active surface of each die).

Allowable Subject Matter

6. Claims 6-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Nguyen whose telephone number is (571)272-1966. The examiner can normally be reached on Monday through Friday, 8:30AM – 5:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cuneo Kamand can be reached at (571)272-1957.

Trung Nguyen
Patent Examiner
Group Art Unit 2829
May 28, 2004

David F. Zarube
Primary Examiner
5/28/04